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FEDERAL COMMUNICATIONS COMMISSION
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BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON D. C. 20554

ORIGINAL
FILE

In the Matter of)
)
)
)
Amendment of the Commission's Rules)
to Establish New Frequencies)
for Cordless Telephones near 44 and 49 MHz)
)

To: The Commission

PETITION FOR RULE MAKING

I. INTRODUCTION

1. The Telecommunications Industry Association (TIA) Personal Communications Section ("the Section") hereby requests that the Commission make available to cordless telephones fifteen additional frequency pairs, on a secondary basis, in the Private Land Mobile Radio Service (PLMRS) bands near 44 and 49 MHz.

2. Currently, there are ten frequency pairs available to cordless telephones in the Government bands near 46 and 49 MHz, under §15.233 of the Commission's Rules. These channels have been available since 1984 and initially were adequate for the needs of cordless telephone service. However, due to a combination of two factors, these channels will not be adequate for the indefinite future. First, the continued popularity of cordless telephones and

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the resulting increase in market penetration threatens to cause a channel-crowding problem, especially in high-density locations such as urban areas and high-rise condominiums. Second, the interference problem is aggravated by the availability of the band 49.82 to 49.90 MHz (which corresponds to five frequencies designated in §15.233 for cordless telephone handset transmit) for use by devices other than cordless telephones (under §15.235). Of particular concern are the "baby monitors," which tend to be active for long periods of time, thus rendering channels unusable for cordless telephones in their vicinity.

3. The Section believes that because of these factors, more channels will be necessary, if cordless telephones are to continue to provide a viable service to the public. As discussed in previous filings with the Commission on this matter, we estimate that twenty to twenty-five channel pairs are necessary to serve the needs of cordless telephones in the residential environment.¹

4. It should also be noted that "offset frequency" operation, whereby the existing ten channels are "split" into a larger number of narrower channels, will not solve the problem. As demonstrated in the Section's *Petition for Reconsideration*² filed in response to the Commission's *Report and Order* on offset frequency operation,³ while channel-splitting creates more channels, the narrow bandwidth of the split channels requires a reduction in the FM

1. See, for example, the Section's *Petition for Rule Making* in the Matter of Amendment of the Commission's Rules to Allocate Additional Spectrum for Cordless Telephones on a Primary and Protected Basis, April 30, 1990.

2. *Petition for Reconsideration* in the matter of Amendment of Part 15 of the Commission's Rules to Permit Cordless Telephone Operation on Offset Frequencies, Gen. Docket 89-626, filed March 12, 1991, TIA Personal Communications Section.

3. *Report and Order* in the matter of Amendment of Part 15 of the Commission's Rules to Permit Cordless Telephone Operation on Offset Frequencies, Gen. Docket 89-626, adopted January 8, 1991, released January 25, 1991.

frequency deviation, reducing the FM capture effect. This increases the required separation between two cochannel users, which decreases the frequency reuse. As explained in the Section's *Petition for Reconsideration*, analysis indicates that the net effect is a slight reduction in capacity (and spectrum efficiency), making offset frequency operation a losing proposition for cordless telephones.⁴ There would also be other undesirable effects, such as a degradation in operating range, even with only background noise (i.e., no cochannel interference) as an impairment. Also, the 5 kHz frequency offsets, compared to the existing center frequency designations, would generate audio tones at the discriminator output, possibly causing signaling anomalies for some of the older units that use guard-tone signaling, and the associated potential for network harm.

5. We therefore have concluded that in the long term, the only viable solution is for additional spectrum to be made available for cordless telephones, even if only on a secondary basis. To maintain design commonality and allow units that can use both the existing and the new frequencies, it is desirable that the new frequencies be as near as practical to the existing ones. Further, it clearly is important that the utilization of the frequencies by any primary users be relatively light.

4. It should be noted that these arguments do not apply to *mobile* radio systems. In mobile radio systems in the 150-900 MHz range, vehicle motion can cause rapid variations in the received signal due to multipath fading, which reduces the FM capture effect. As a result, the frequency reuse achieved in mobile radio systems is not as strongly affected by channel splitting as it is with cordless telephone systems. Thus, with proper design, mobile radio systems may achieve significant capacity improvements with channel splitting that are not achievable with cordless telephones.

II. PROPOSAL

6. Thirty frequencies have been identified near 44 and 49 MHz (15 in each band) allocated to the PLMRS which appear lightly-used enough to reasonably consider sharing by cordless telephones on a secondary basis. These frequencies are:

Low side	High side
43.72	48.76
43.74	48.84
43.82	48.86
43.84	48.92
43.92	49.02
43.96	49.08
44.12	49.10
44.16	49.16
44.18	49.20
44.20	49.24
44.32	49.28
44.36	49.36
44.40	49.40
44.46	49.46
44.48	49.50

The Section has taken a number of preliminary steps to understand the use of these frequencies, including examination of Part 90 of the Commission's Rules governing their use, analysis of the license data on the frequencies of interests, and some informal monitoring in selected areas. The key question is whether there is any location likely to have a high density of cordless telephones in which a large fraction of the proposed frequencies in either the 49 MHz or 44 MHz band is used. Our preliminary conclusion is that the usage is indeed fairly light, and at this point there do not appear to be any major population centers in which a sizable fraction of the 30 frequencies is assigned. Thus, while our investigation will continue,

our preliminary results suggest that the frequencies are suited to sharing with cordless telephones.

7. It will be beneficial to both cordless telephone users and to primary licensees if, as a condition for using the frequencies, cordless telephones are designed to automatically determine whether a channel is occupied prior to using it. This will prevent cordless telephones interfering with, or sustaining interference from, the primary licensees. The Rules governing use of these frequencies by cordless telephones therefore should include a provision similar to that governing internal transmitter control systems in Part 90 of the Commission's Rules, which states:

“ The system must include automatic monitoring equipment, installed at the base station transmitter site(s), which will prevent the activation of the system when signals of other cochannel stations are present.”⁵

To apply this concept to cordless telephones, we propose the following wording:

Cordless telephones using these frequencies must include a mechanism for automatically monitoring, and preventing transmitter activation on, frequencies on which cochannel signals are present.

8. Other than this additional “interference avoidance” requirement, the Section believes that the Part 15 Rules for these new frequencies should be identical to those in §15.233 governing the existing 46/49 MHz channels, with a few minor exceptions as follows:

- There should be no specific high/low pairing of the new frequencies. Because the primary users operate in the simplex mode, interference from primary users on high and low

5. 47 CFR 90.475(a)(5).

frequencies will be uncorrelated, so with the interference avoidance mechanism discussed above, minimum blocking is achieved by allowing handset and base transmit frequencies to be selected independently.

- No offset frequency or interstitial operation. As summarized above and discussed at length in the Section's *Petition for Reconsideration* in Docket 89-626, such operation would introduce several problems while providing no compensating benefits. The center frequencies listed above should be specified in the Rules, with a 20 kHz modulation bandwidth allowed as in the current §15.233.

III. DISCUSSION

9. Section members unanimously agree that the proposed frequencies offer a good solution for a problem that has been a growing concern during recent years. The proximity of the frequencies to the existing channels is acceptable from a design perspective, and the apparently light usage of the frequencies by the PLMRS licensees coupled with the proposed interference avoidance mechanism should allow harmonious coexistence between the two services.

10. However, we acknowledge the potential for concern on the part of PLMRS users regarding the possibility of interference between their operations and cordless telephones, and would like to address those concerns in advance, to the extent that we can anticipate them.

11. Consider the possibility of interference from a cordless telephone into a PLMRS receiver. In §15.233, the maximum transmitter output is a field strength of 10 mV/m measured 3 meters from the transmitting antenna. If this field strength is assumed to

represent the radiation (“far”) field, then it equates to a total radiated power of 20 *microwatts*, assuming the antenna is a short dipole (e.g., a “whip”) with a directive gain factor of 1.5 (1.76 dBi). This minuscule transmit power level could not cause any discernible interference to a PLMRS receiver unless the receiver was extremely close to the cordless telephone (e.g., within a few hundred feet of it) *and* at the end-of-range with respect to its own base station (otherwise the carrier-to-interference ratio would still be sufficiently strong to overpower the cordless telephone signal). In addition, if the PLMRS unit were active, its transmissions would prevent any nearby cordless telephone from using its channel in the first place, due to the interference avoidance protocol.

12. Therefore, it is the Section’s belief that imposing the channel monitoring discipline on cordless telephones should protect both cordless telephones and PLMRS licensees from harmful interference, should the proposed channels be shared between the two groups. Even without this discipline, the likelihood of interference from cordless telephones into the PLMRS would be extremely small due to the minimal transmit power cordless telephones are allowed. Further, because cordless telephones would be secondary users of the frequencies, any interference sustained by cordless telephones from PLMRS operations must by definition be accepted without recourse. Our proposal consequently carries little or no risk to the primary users.

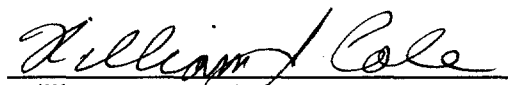
IV. CONCLUSION

13. Based on the reasons discussed above, the TIA Personal Communications Section hereby respectfully requests that the Commission issue a *Notice of Proposed Rule Making* (NPRM) proposing use of the frequencies listed above, subject to the constraints discussed herein.

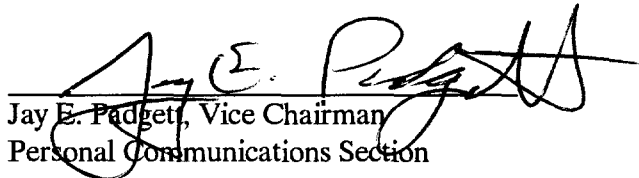
Respectfully submitted,

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